

**CLAIMS**

What is claimed is:

- 1    1.    A magnetic head, comprising:  
2        a sensor having an antiparallel (AP) pinned layer structure, wherein the AP  
3                pinned layer structure includes at least two pinned layers having magnetic  
4                moments that are self-pinned antiparallel to each other, the pinned layers  
5                being separated by an AP coupling layer; and  
6        a pair of compression layers positioned towards opposite track edges of the  
7                sensor, the compression layers providing compressive stress to the sensor.
  
- 1    2.    A head as recited in claim 1, wherein the compression layers are constructed of  
2        metal.
  
- 1    3.    A head as recited in claim 1, wherein the compression layers are constructed of  
2        rhodium.
  
- 1    4.    A head as recited in claim 1, wherein the compression layers are constructed of  
2        tantalum.
  
- 1    5.    A head as recited in claim 1, wherein the compression layers are constructed of  
2        tungsten.

- 1     6.     A head as recited in claim 1, wherein the compression layers are constructed of a  
2           dielectric material.
- 1     7.     A head as recited in claim 1, wherein the compression layers are positioned  
2           substantially outside the track edges of the sensor.
- 1     8.     A head as recited in claim 1, wherein the compression layers are substantially  
2           aligned with the sensor.
- 1     9.     A head as recited in claim 1, further comprising hard bias layers positioned  
2           towards opposite track edges of the sensor, the compression layers being  
3           positioned above the hard bias layers.
- 1     10.    A head as recited in claim 1, further comprising shield layers positioned above  
2           and below the sensor, and at least one electrically insulative layer positioned  
3           towards each of the compression layers for preventing conduction of electricity  
4           through the compression layers from one shield layer to the other shield layer.
- 1     11.    A head as recited in claim 1, further comprising shield layers positioned above  
2           and below the sensor, and at least one electrically insulative layer positioned  
3           towards each of the compression layers for preventing conduction of electricity  
4           through the compression layers from the sensor to one of the shield layers.

- 1    12.    A head as recited in claim 1, wherein the head forms part of a GMR head.
- 1    13.    A head as recited in claim 1, wherein the head forms part of a CPP GMR sensor.
- 1    14.    A head as recited in claim 1, wherein the head forms part of a CIP GMR sensor.
- 1    15.    A head as recited in claim 1, wherein the head forms part of a tunnel valve sensor.
- 1    16.    A magnetic head, comprising:  
2            a sensor having an antiparallel (AP) pinned layer structure, wherein the AP  
3                    pinned layer structure includes at least two pinned layers having magnetic  
4                    moments that are self-pinned antiparallel to each other, the pinned layers  
5                    being separated by an AP coupling layer; and  
6            a pair of compression layers positioned towards opposite track edges of the  
7                    sensor, the compression layers providing compressive stress to the sensor;  
8            wherein the compression layers are positioned substantially outside the track  
9                    edges of the sensor.
- 1    17.    A head as recited in claim 16, wherein the compression layers are constructed of  
2            metal.

- 1 18. A head as recited in claim 16, wherein the compression layers are constructed of  
2 rhodium.
- 1 19. A head as recited in claim 16, wherein the compression layers are constructed of  
2 tantalum.
- 1 20. A head as recited in claim 16, wherein the compression layers are constructed of  
2 tungsten.
- 1 21. A head as recited in claim 16, wherein the compression layers are constructed of a  
2 dielectric material.
- 1 22. A head as recited in claim 16, wherein the compression layers are substantially  
2 aligned with the sensor.
- 1 23. A head as recited in claim 16, further comprising hard bias layers positioned  
2 towards opposite track edges of the sensor, the compression layers being  
3 positioned above the hard bias layers.
- 1 24. A head as recited in claim 16, further comprising shield layers positioned above  
2 and below the sensor, and at least one electrically insulative layer positioned  
3 towards each of the compression layers for preventing conduction of electricity  
4 through the compression layers from one shield layer to the other shield layer.

1   25.   A head as recited in claim 16, further comprising shield layers positioned above  
2           and below the sensor, and at least one electrically insulative layer positioned  
3           towards each of the compression layers for preventing conduction of electricity  
4           through the compression layers from the sensor to one of the shield layers.

1   26.   A head as recited in claim 16, wherein the head forms part of a GMR head.

1   27.   A head as recited in claim 16, wherein the head forms part of a tunnel valve  
2           sensor.

1   28.   A magnetic storage system, comprising:  
2           magnetic media;  
3           at least one head for reading from and writing to the magnetic media, each head  
4                having:  
5                a sensing element having the structure recited in claim 1;  
6                a write element coupled to the sensor;  
7           a slider for supporting the head; and  
8           a control unit coupled to the head for controlling operation of the head.